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EXAMINER

SUCH, MATTHEW W

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/523,216	Applicant(s) CLEMENS ET AL.	
	Examiner MATTHEW W. SUCH	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-15 and 17-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 2-15 and 17-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: Reference sign "5" is not in Figure 8 as described by Applicant's specification (see Para. [00022] on Page 7).

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The abstract of the disclosure is objected to because the abstract must be a single paragraph. As currently written there are two paragraphs in the abstract.

Response to arguments: *The Applicant argues that the first sentence is the title of the disclosure. This much is clear. However, the manner in which the abstract is written also includes this sentence as a separate paragraph because the heading "Abstract" appears before the title. See 37 CFR 1.72(b) and MPEP § 608.01(b).*

3. The disclosure is objected to because of the following informalities: there is a period missing at the end of the first sentence.

Response to arguments: *The Applicant argues that the first sentence is the title of the disclosure. This much is clear. However, since the first sentence is notated with [0001] as a paragraph number, this sentence is part of the specification and will be printed as such (see, for example, the pre-grant publication of the present application US 2006/0024947). As such, since this sentence is part of the specification it either requires either (i) a period or (ii) removal of the paragraph identifier such that the sentence is distinguished from the specification. Additionally, the manner in which the first sentence is placed also includes the heading "Description" appearing before the title. Appropriate correction is required.*

4. The amendment filed 17 February 2009 is objected to under 35 U.S.C. 132(a) because it introduces new matter into the disclosure. 35 U.S.C. 132(a) states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: the phrase "(polypropylene)" added to Para. [00014] of the specification is new matter. The originally filed disclosure provides no support for PP being polypropylene.

Response to arguments: *The Applicant argues that PP is commonly known to be polypropylene and cites Wikipedia for support. However, polypropylene is not the only material that uses PP as an abbreviation and it is not clear that this material was the one intended at the time of the invention. These arguments along with the citation to Wikipedia does not constitute*

Art Unit: 2891

evidence that the recitation of PP as originally filed is polypropylene for at least the following reasons. First, Wikipedia is open-source and as such does not provide evidence of the Applicant's intention for PP as originally filed and when the application was filed. Secondly, as shown above, PP is a common abbreviation to other materials distinct from polypropylene, such as polypyrrole (see US 4,891,733 Col. 1, Line 62; US 4,832,869, Col. 2, Line 37; US 4,629,798, Col. 4, Line 34, at least). Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Objections

5. Claim 17 is objected to because of the following informalities: the phrase "the lower layer" in Line 7 should read "the first lower layer". Appropriate correction is required.

6. Claim 19 is objected to because of the following informalities: the phrase "the lower layer" in Line 3 should read "the first lower layer". Appropriate correction is required.

7. Claim 20 is objected to because of the following informalities: the phrase "the first layers" in Line 3 should read "the first plurality of layers" and the phrase "the lower layer" in Line 6 should read "the first lower layer". Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

Art Unit: 2891

pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. Claims 2-3 and 14-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose the combination of elements including the (i) disruption element and (ii) the truncated conical cross-section profile of the through plating. The truncated conical cross-section profile of the through plating is disclosed in the embodiment of Figures 1-7 which does not have the disruption element. The disruption element is disclosed in the embodiment of Figure 8, which does not show the truncated conical cross-section profile of the through plating.

Claim 13 as written describes a first layer (Element 2 in Figure 8), a disruption element (Element 7 in Figure 8) on a portion of the first layer over a given region of the first layer, a plurality of layers (Element 4 in Figure 8) applied to the first layer, at least a first portion of the plurality of layers comprising predominantly organic material, the disruption element being arranged to result in a void in a second portion of the plurality of layers in the area above the disruption element when the plurality of layers are applied to the first layer including the disruption element (this language renders the claim indefinite, see below), a through plating (Element 6 in Figure 8) in the resulting void for forming an electrical interconnection to at least two of the plurality of layers. However, claims 2-3 and 14-15, which depend from claim 13, then change the through plating (Element 6 in Figure 8) to the truncated conical cross-section

Art Unit: 2891

profile of the through plating (Element 3 in Figures 2-7). The through plating of Element 6 cannot itself be the truncated conical cross-section profile of the through plating because it does not have such a shape.

Response to arguments: *The Applicant argues that such a combination of elements is supported by the originally filed disclosure and points to Page 3-32. However, the first mention of the disruption element in the entire specification is at Page 6, Line 17, which is the first line of Para. [00021] and only in reference to the embodiment of Figure 8. The Applicant points to Page 6, Lines 4-5 as teaching that "the disruption element prevents wetting of the lower conductive layer 2" (see Remarks Page 15, Line 6). However, the passage cited the Applicant actually reads "the other Figures, and it can be seen that the through-plating 3 affords a conducting connection between the lower conductor track 2 and the upper conductor track" which teaches absolutely nothing about the disruption element. The Applicant points to Page 6, Line 6 as teaching that "holes are produced in layers which are to be through plated" (see Remarks Page 15, Line 7). However, the passage cited the Applicant actually reads "Figure 5 shows the same layer structure as that shown in Figures 1-3" which teaches absolutely nothing about the disruption element. The Applicant points to Page 6, Line 12 as teaching that "the disruption element can be a material" (see Remarks Page 15, Line 8). However, the passage cited the Applicant actually reads "other, as occurs for example in a lamination process. As a result both the respective" which teaches absolutely nothing about the disruption element. The Applicant points to Page 6, Lines 15-16 as teaching that "the disruption element can be a change in physical/chemical properties of the surface of layer 2, and which surface properties are altered" (see Remarks Page 15, Lines 9-10). However, the passage cited the Applicant actually*

Art Unit: 2891

reads "which can be recognized in the cross-section profile is here a hyperboloid, that is to say the shape of two truncated coned which are joined 'head-to-head'" which teaches absolutely nothing about the disruption element.

There is absolutely no statement anywhere in the specification that the disruption element can be used in combination with the embodiments disclosed in Figures 1-7 and the associated text. Furthermore, it is not plain to one of ordinary skill in the art that the disruption element is envisaged to be used with the truncated conical cross-section profile of the through plating. In fact, the specification is clearly teaching that they are distinct from one another. This is shown by the language of the specification which clearly sets apart Figure 8 from the others (see the sentence "Figure 8 shows another way of producing the through-plating" at the beginning of Para. [00021]). But more importantly, the embodiment of Figure 8 is clearly set apart from the others since the truncated conical cross-section profile of the through plating is taught to, by itself, be useful for providing an opening in the functional layers 4, 5. Since the truncated conical cross-section profile of the through plating causes such an opening, what purpose would the disruption element (which is taught to form just such an opening) serve, if one were to somehow combine these two embodiments? The specification provides no guidance on such issues nor envisages their use together in a combination. Therefore, somehow combining the disruption element with the other embodiments, as alleged by Applicant as being supported by the originally filed disclosure, makes no physical sense in light of the teachings of the Applicants own specification. As such, the Applicant's arguments are not persuasive and the rejection is deemed proper and maintained.

Art Unit: 2891

10. Claim 5 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The specification does not disclose the combination of elements including the disruption element and the rough surface of the through plating. The rough surface of the through plating is disclosed in the embodiment of Figures 1-7 which does not have the disruption element. The disruption element is disclosed in the embodiment of Figure 8, which does not show rough surface on the through plating.

Response to arguments: *The Applicant argues that claim 5 does not call for a disruption element. This is incorrect. Claim 5 calls for the disruption element by way of claim 13. Applicant asserts that since Figures 2-7 all show the through plating 3 as having a jagged upper surface and that the disruption element is also present for the reasons of preceding paragraphs. However, as noted above, the embodiment of the invention set forth in Figures 2-7 and associated text fails to include the disruption element in combination with all of the claimed elements. As such, the Applicant's arguments are not persuasive and the rejection is deemed proper and maintained.*

11. Claim 23 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. As

Art Unit: 2891

currently written, claim 23 adds in a third plurality of layers that the through plating extends through. However, such language has introduced more layers into the device than are disclosed by the specification. The previous claim 17 requires a first plurality of layers, which includes a second plurality of predominantly organic functional layers and the first plurality of layers includes a first lower layer (Element 2 in Fig. 4, for example) and a central layer (Element 4 for example). The specification only discloses one more layer (Element 5, for example) that the through plating (Element 3) extends through. Since the claim uses the language of "a third plurality", this requires more than one additional layer, such as two layers. One layer is disclosed (Element 5, for example), but a second layer is not disclosed (which is needed in order for a third plurality of layers to be present).

Response to arguments: *Applicant's traversal of the rejection is not convincing because it actually serves to illustrate the examiner's position very well. Applicant points out in the analysis that "wherein the through plating extends through each of a third plurality of layers (1, 2, 4 - upper half of figure 7)" (see Remarks Page 18, Lines 18-19). However, as shown in Figure 7, the through plating (Element 3) does not extend through Elements 1 and 2 on the top half of the figure, but rather, terminates at those elements. Therefore, the claim is unsupported for this reason alone. Furthermore, as shown by Applicant's own analysis, claim 23 refers to the upper Element 4 as part of the "third plurality of layers". This cannot be since the Applicant has already established that the upper of Element 4 is "a second plurality of organic functional layers (there are two organic functional layers 4 shown" (see Remarks Page 18, Lines 12-14). The Applicant cannot refer to a limitation in a claim and change its nomenclature without clearly setting forth such a nomenclature change. Claim 23, as currently written, fails to*

Art Unit: 2891

establish that one of the second plurality of layers is actually part of the third plurality of layers. Such an interpretation of claim 23, as currently written, would require an additional reason for rejection under 35 U.S.C. 112, second paragraph. Therefore, the third plurality of layers, through which the "through plating" extends cannot be any of Elements 4 (because Element 4 is part of the second plurality of layers) and also cannot be any of Elements 1 or 2 (because the specification does not teach that the "through plating" extends through any of Elements 1 or 2). Therefore, the "third plurality of layers" must be some undisclosed set of layers. As such, the rejection of claim 23 under 35 U.S.C. 112, first paragraph, as set forth is proper and maintained.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "the electronic component as set forth in claim 13 wherein the component includes an electrically non-conducting insulating material wherein at least one of the plurality of layers and the non-conducting material is selected from the group consisting of polyhydroxystyrene, polymethylmethacrylate and/or polystyrene, a semiconducting material including polyalkylthiophene and polyfluorene and a mixture thereof". This amended language renders the claim indefinite because it is unclear what is actually being claimed. An expansive analysis of this language yields the following: The claim adds the limitation of an electrically non-conducting material (must be Element 1 as shown in Figure 8, since the other of elements

Art Unit: 2891

are already accounted for in the preceding claim and the non-conducting material cannot be Element 2, since the specification teaches that Element 2 is conductive and is therefore not a non-conductive material). The claim then continues and set forth "wherein at least one of (i) the plurality of layers and (ii) the non-conducting material" pointing to at least one of (i) or (ii).

Once at least one of (i) or (ii) is identified, the claim states "is selected from the group consisting of polyhydroxystyrene, polymethylmethacrylate and/or polystyrene". It is not clear if the Markush group ends here or if it also further includes "a semiconducting material including polyalkylthiophene and polyfluorene and a mixture thereof". Clarification is required. If one were to interpret that "a semiconducting material" was part of the recited Markush grouping for the at least one of (i) or (ii), then the claim is further indefinite because a semiconductor material is not a non-conducting material of (ii), although it could be among the plurality of layers (i).

However, if "a semiconductor material" is not part of the Markush grouping, then it is an additional element of the claim and may not be supported by the specification. However, such an analysis for compliance under 35 U.S.C. 112, first paragraph, is currently not possible given the ambiguities and indefiniteness of the current language. Further still, the phrase "including polyalkylthiophene and polyfluorene and a mixture thereof" also raises ambiguity in the claim.

The phrase "and a mixture thereof" appears to be unnecessary because the element of "a semiconducting material" already requires both "polyalkylthiophene and polyfluorene".

However, if the Markush group also includes "a semiconductor material", then does the "mixture thereof" also apply to the "polyhydroxystyrene, polymethylmethacrylate, and/or polystyrene"?

Clarification is required. For proper language to claim Markush groups, see MPEP § 2173.05(h).

Art Unit: 2891

14. Claim 11 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites the material PP. It is unclear what PP is intended to be and the specification provides no description of what the Applicant considers PP to be. For example, PP can be an abbreviation of a number of different materials at least including polypropylene, polypyrrole, polyphthalamide, polyphthalate, etc.

Response to arguments: *The Applicant stated that PP has been removed from the claim. However, the recitation of PP is still present.*

15. Claim 12 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This claim is indefinite for a variety of reasons. The claim recites "forming a plurality of layers including a first lower layer, a majority of which layers". However, is the recitation of "a majority of which layers" referring to (i) all of the plurality of layers including a first lower layer, or (ii) the plurality of layers with the exception of the first lower layer? Clarification is required. The claim recites "a majority of which layers are of predominantly organic material and which organic material includes an insulating layer". This renders the claim indefinite because it is unclear whether Applicant is trying to say that the organic material includes an insulating layer (as in an organic insulating material) or if the organic material includes an insulating layer (as in another layer of the plurality of layers). The claim recites "the forming of the first lower layer being followed by forming subsequent layers deposited sequentially on the first lower layer". However, this recitation renders the claim indefinite

Art Unit: 2891

because it is unclear how the "subsequent layers" relate to "a plurality of layers" or if the "subsequent layers" are new elements that are not included as part of the plurality of layers. If the subsequent layers are part of the plurality of layers (a majority of which are organic, and including an insulator layer) it is unclear how an insulator layer can be ohmically intercoupled to anything, since it is an insulator.

Response to arguments: *Applicant's arguments with respect to the rejection of claim 12 under 35 U.S.C. 112, second paragraph, have been considered but are moot in view of the new ground(s) of rejection due to Applicant amendment.*

16. Claim 17 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "and is electrically coupled to at least two layers of said first plurality of layers and second plurality of predominantly organic functional layers" Lines 8-9. This recitation renders the claim indefinite because it is unclear if the claim is referring to at least two of both the first and the second layers, at least two of each of the first and second layers, or at least two of the combination of the first layers and the second layers. This is more confusing since the claim also recites that the first plurality of layers includes a second plurality of predominantly organic functional layers (see Lines 2-3).

17. Claim 20 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "and is electrically coupled to at least two of said first and

Art Unit: 2891

second plurality of layers" Lines 8-9. This recitation renders the claim indefinite because it is unclear if the claim is referring to at least two of both the first and the second layers, at least two of each of the first and second layers, or at least two of the combination of the first layers and the second layers. This is more confusing since the claim also recites that the first plurality of layers includes a second plurality (see Lines 2-3).

18. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The phrase "extends from a lower layer to an upper layer" in Lines 3-4 renders the claim indefinite because it is unclear whether the recitation of "a lower layer" is referring to the element of "further lower layers" (see Line 2 of claim 21) or if the recitation of "the lower layer" is referring to the element of "the first lower layer" (see Line 3 of claim 17).

19. Claim 23 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claim recites "being electrically conductive and at least two layers of said first and second plurality of layers" Lines 4-5. This recitation renders the claim indefinite because it is unclear if the claim is referring to at least two of both the first and the second layers, at least two of each of the first and second layers, or at least two of the combination of the first layers and the second layers. This is more confusing since the claim also recites that the first plurality of layers includes a second plurality (see Lines 2-3).

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

21. In so far as definite, claims 12 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend (WO '938) in view of Sakai (JP '046).

a. Regarding claims 12 and 13, Friend teaches a process of producing at least one through-plating by forming a plurality of layers (Elements 1, 2, 3, 4, 5, 7 in Fig. 14c or Elements 1, 2, 3, 4, 5, 6, 7 in Fig. 14d) including a first lower layer (Element 3). A majority of the layers are organic material and which organic material includes insulating layers (Page 10, Lines 17-20 teaches that Elements 2 and 3 are organic; Page 11, Lines 11-18 teaches that Element 4 is organic; Page 12, Lines 20-28 teaches that Element 5 is organic; Page 15, Lines 3-10 teaches that Element 7 is organic). The forming of the first lower layer is followed by forming subsequent layers (Elements 4, 5, 7 in Fig. 14c or Elements 4, 5, 6, 7 in Fig. 14d) on the first lower layer. Continuing, after the void is formed, a through plating (Element 6 in Fig. 14c or Element 32 in Fig. 14d) is formed in the resulting void wherein at least a second portion of layers of the subsequently deposited layers are ohmically intercoupled to each other by the through plating (Elements 4 and 6 are coupled together ohmically, see schematic of Figure 15b). The

examiner notes several issues with the claim language at this point. Firstly, the term "on" does not require that the disruption element be directly on (in contact with) the first lower layer and intervening layers can be therebetween. However, for the purposes of compact prosecution, the examiner provisionally interprets the disruption element to be in contact with the first lower layer. Secondly, the manner in which the claim is written does not establish the order in which the disruption element is formed relative to the formation of the subsequent layers. The claim merely requires that the subsequent layers are formed after forming the first lower layer is formed. Nothing about the claim language requires that the disruption element is formed on the first lower layer prior to forming subsequent layers. Again, however, in the interest of compact prosecution, the examiner provisionally interprets that the disruption element is formed on the first lower layer before the subsequent layers. Under such interpretation, Friend teaches forming a void by forming a first lower layer including forming a disruption element of solvent material (Pages 33-34) on the first lower layer which element is arranged to result in a void in at least a first portion of subsequently deposited layers on the first lower layer instead of a disruption element in directly on the first lower layer which results in a void of the spin coated layers formed thereon.

However, Sakai teaches a method of forming a first lower layer (Element 2) with a disruption element (Element 6) formed in contact with the first lower layer and on the first lower layer. Subsequently deposited organic layers are then coated thereon and a void is formed where the disruption element is located (see Fig. 2c). Following the coating of the subsequent layers and the void formation, a through plating (Element 4) is

Art Unit: 2891

formed on the void (see Fig. 2d). It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the void of Friend by forming a disruption element on and in contact with the first lower layer prior to the forming of the subsequent layers as taught by Sakai. One would have been motivated to do so since Sakai teaches that this method has the advantage of formation of a via hole with using an etching process of interlayer insulating layers of an organic material otherwise affected by scattering (see Sakai Abstract, for example).

b. Regarding claim 4, as best can be determined, the Applicant is attempting to claim materials that can make up (i) the plurality of layers or (ii) the non-conducting material. As pointed out under 35 U.S.C. 112, second paragraph, above, it is unclear what is included and excluded from the Markush language of the claim. As such, the examiner provisionally interprets that the claim is claiming that the electrically non-conductive material is polyhydroxystyrene, polymethylmethacrylate, polystyrene, polyalkylthiophene, polyfluorene or a mixture thereof. Friend teaches that the component includes an electrically non-conducting insulating material wherein the non-conducting material is polyhydroxystyrene (see Page 12, Line 21), polymethylmethacrylate (see Page 13, Line 1), or polystyrene (see Page 15, Line 10).

c. Regarding claim 5, Friend teaches that the through plating comprises a raised portion (Element 6 in Fig. 14c or Element 32 in Fig. 14d) above relative to the first layer. This layer has some level of surface roughness, which "promotes" ohmic contacting

Art Unit: 2891

because all materials have some level of surface roughness, even at the atomic or molecular scale, and the claim does not establish any degree to which the surface is rough, nor does the claim identify what level of surface roughness "promotes" ohmic contacting, or even what a promoted level of contacting is. The claim also does not establish what is being ohmically contacted. As such, given the breadth of such descriptions of the claim, the material of Friend meets the limitations of the claim as currently written.

d. Regarding claims 6 and 7, Friend teaches that the first layer comprises a lower functional layer (this claim language amounts to a mere nomenclature change since there are no elements added to what is already present) and the disruption element as modified with Sakai manifests a physical and chemical treatment of the lower functional layer since the language of manifests merely describes what the disruption element does and not what the disruption element is to further distinguish the claimed subject matter.

e. Regarding claim 8, Friend teaches that the first layer (Element 3) comprises a lower functional organic layer of PEDOT, for example (Page 10, Lines 17-20).

f. Regarding claim 9, Friend teaches that the first layer (Element 3) comprises a lower functional organic layer of PEDOT, for example (Page 10, Lines 17-20) and the disruption element manifests a locally restricted change in the surface energy of the organic functional layer. The language of "at which substantially no wetting by a

Art Unit: 2891

subsequently applied organic material of a subsequent functional layer is present", does not distinguish the claim from the structural limitations of the prior art. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). See MPEP § 2112.01. This language does not introduce any additional elements into the claimed structure of the device, but instead merely describes the behavior of the disruption element under such conditions. Furthermore, Sakai teaches this same behavior of the disruption element (see Fig. 2c, for example).

g. Regarding claim 10, Friend in view of Sakai teaches that the disruption element is on the first layer and comprises a chemical which provide a material residue on the first layer (see Element 6 of Sakai). The language of "at which prior to or after application of the plurality of layers, the disruption element is detectable by at least one of a material residue, the shape of the disruption element, traces or a material on the first layer", does not distinguish the claim from the structural limitations of the prior art. While features of an apparatus may be recited either structurally or functionally, claims directed to an apparatus must be distinguished from the prior art in terms of structure rather than function. *In re Schreiber*, 128 F.3d 1473, 1477-78, 44 USPQ2d 1429, 1431-32 (Fed. Cir. 1997). See MPEP § 2112.01. This language does not introduce any additional elements into the claimed structure of the device, but instead merely describes the behavior of the

Art Unit: 2891

disruption element under such conditions. Furthermore, Sakai teaches this same behavior of the disruption element (see Fig. 2c, for example).

22. In so far as definite, claims 2-3 and 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Friend (WO '938) in view of Sakai (JP '046) as applied to claim 13 above, and further in view of Schmidt ('881).

Friend teaches that the through plating comprises a solid conductive material of PEDOT, for example (Page 13, Line 8) and is a free-standing portion relative to the first layer (see Fig. 14c, for example). Friend does not teach that the through plating has a truncated conical cross section.

However, Schmidt teaches truncated conical cross-sectional through platings (Elements 11, 11'; Figure 2g, for example). It would have been obvious to one of ordinary skill in the art at the time the invention was made to truncate the conical cross-section of Friend in view of Sakai as taught by Schmidt in order to increase the surface area of the contact interface, thereby reducing contact resistance to the gate electrode portion of the device (see, for example, Schmidt Col. 4, Lines 28-31 and Drury Col. 2, Lines 30-56).

23. In so far as definite, claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Friend (WO '938) in view of Sakai (JP '046) as applied to claim 13 above, and further in view of Kelley ('472).

Friend in view of Sakai teaches glass substrate instead of a plastic substrate which includes one of PET, PP, PEN, polyimide, polyamide, and coated paper.

Art Unit: 2891

Kelley teaches plastic substrates including, for example, polyimide (see Para. 0017). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have a polyimide substrate as taught by Kelley in the device of Friend in view of Sakai. One would have been motivated to do so since Kelley teaches that polyimide plastic substrates are advantages because they are flexible and allow for roll-to-roll processing providing for economies of scale over rigid substrates (see Para. 0017).

9. In so far as definite, claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Noddin ('853) in view of Kurashima ('710) in view of Jonas ('437).

The examiner notes that the language of "a first plurality of layers including a second plurality of predominately organic functional layers at least one of the first [plurality] layers is a first lower layer and at least one other of the first plurality of layers is a central layer" amounts to only requiring "a first lower layer" and "a central layer" which are "predominantly organic functional layers". This is because the language of "a first plurality of layers including a second plurality of predominately organic functional layers" merely amounts nomenclature that does not add any addition limitations to the claim other than that "a first plurality of layers" are "predominantly organic functional layers". The claim then identifies that the first plurality of layers has a "a first lower layer" and "a central layer". Therefore, these are the only elements required by such language.

Noddin teaches an electronic component comprising a first plurality of layers (Elements 9, 7, 5, 3, 4, 6, 8, 10 in Fig. 1) including a second plurality of functional layers (Elements 5, 6, 10), at least one of the first layers is a first lower layer (Element 9) and at least one other of the

Art Unit: 2891

first plurality of layers is a central layer (Element 3 or 4, for example). At least one through plating via (Element 12 in Fig. 1) having a truncated conical cross-sectional profile (Elements D1 to D2, Fig. 1) which extends from the first lower layer through at least the central layer transversely to the central layer (see Fig. 1). The at least one through plating via has a truncated conical cross-section profile extending at least in part below the central layer (down to Element in Fig. 1 when viewed upside down) and is electrically coupled to at least two of the second plurality of layers.

Noddin does not teach that the through plating via is filled with conductive material to form a through plating. However, Kurashima teaches truncated conical through plating vias (Elements 24 in Figs. 1-2) which are filled with conductive material (Elements 28 in Figs. 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to fill the through plating via of Noddin with conductive material as taught by Kurashima. One would have been motivated to do so in order to form electrical connections in the device (see Kurashima Para. 0118, Lines 15-19, for example).

Noddin does not teach that the second functional layers are predominantly organic, but instead are interconnects of, copper, for example. However, Jonas teaches forming interconnect of predominantly organic material, such as 3,4-polyethylenedioxythiophene and polystyrene sulfonate (PEDOT:PSS, Col. 1, Lines 54-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PEDOT:PSS in the interconnects of Noddin, thereby making the second functional layers into second functional layers of predominantly organic material. One would have been motivated to do so since Jonas teaches

Art Unit: 2891

that these electrically conductive compounds can be screen printed and are suitable as electrodes in semiconductor devices and printed circuit boards (see Col. 3, Lines 30-40, for example).

10. In so far as definite, claims 17-19 and 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Noddin ('853) in view of Kurashima ('710) in view of Jonas ('437).

h. Regarding claim 17, The examiner notes that the language of "a first plurality of layers including a second plurality of predominately organic functional layers at least one of the first [plurality] layers is a first lower layer and at least one other of the first plurality of layers is a central layer" amounts to only requiring "a first lower layer" and "a central layer" which are "predominantly organic functional layers". This is because the language of "a first plurality of layers including a second plurality of predominately organic functional layers" merely amounts nomenclature that does not add any addition limitations to the claim other than that "a first plurality of layers" are "predominantly organic functional layers". The claim then identifies that the first plurality of layers has a "a first lower layer" and "a central layer". Therefore, these are the only elements required by such language.

Noddin teaches an electronic component comprising a first plurality of layers (Elements 9, 7, 5, 3, 4, 6 in Fig. 1) including a second plurality of functional layers (Elements 5, 6, 10), at least one of the first layers is a first lower layer (Element 9) and at least one other of the first plurality of layers is a central layer (Element 3 or 4, for example). At least one through plating via (Element 12 in Fig. 1) having a truncated

Art Unit: 2891

conical cross-sectional profile (Elements D1 to D2, Fig. 1) which extends from a wider region (at Element D2) at the first lower layer through at least the central layer transversely to the central layer (see Fig. 1) to a narrower region (at Element D1, for example) spaced apart from the first lower layer. The at least one through plating via has a truncated conical cross-section profile extending at least in part below the central layer (down to Element in Fig. 1 when viewed upside down) and is electrically coupled to at least two of the second plurality of layers.

Noddin does not teach that the through plating via is filled with conductive material to form a through plating. However, Kurashima teaches truncated conical through plating vias (Element 24 in Figs. 1-2) which are filled with conductive material (Element 28 in Figs. 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to fill the through plating via of Noddin with conductive material as taught by Kurashima. One would have been motivated to do so in order to form electrical connections in the device (see Kurashima Para. 0118, Lines 15-19, for example).

Noddin does not teach that the second functional layers are predominantly organic, but instead are interconnects of, copper, for example. However, Jonas teaches forming interconnect of predominantly organic material, such as 3,4-polyethylenedioxythiophene and polystyrene sulfonate (PETOT:PSS, Col. 1, Lines 54-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use PEDOT:PSS in the interconnects of Noddin, thereby making the second functional layers into second functional layers of predominantly organic

Art Unit: 2891

material. One would have been motivated to do so since Jonas teaches that these electrically conductive compounds can be screen printed and are suitable as electrodes in semiconductor devices and printed circuit boards (see Col. 3, Lines 30-40, for example).

i. Regarding claim 18, the device of Noddin in view of Kurashima in view of Jonas has an electrically conductive through plating and is ohmically coupled to at least two of the second plurality of layers (conductive material in the through plating via, Element 12 in Fig. 1 of Noddin, makes electrical contact to each of second plurality of layers of Elements 5 and 6 in Fig. 1 of Noddin where those layers are exposed to the through plating via as shown in Fig. 1 of Noddin).

j. Regarding claim 19, the device of Noddin in view of Kurashima in view of Jonas has a third plurality of layers on the first layer layer which forms upper layers (Elements 8 and 10 in Fig. 1 of Noddin) the through plating extends from the first lower layer through at least one upper layer (see Fig. 1 of Noddin).

k. Regarding claim 21, the device of Noddin in view of Kurashima in view of Jonas has further lower layers and upper layers in the first and second plurality of layers (chosen from Elements 9, 7, 5, 3, 4, 6 in Fig. 1 of Noddin, which make up the first and second plurality of layers) and the through plating decreases in diameter as the through plating extends from a lower layer (for example, Element 7 in Fig. 1 of Noddin) to an upper layer (for example, Element 8 in Fig. 1 of Noddin).

l. Regarding claim 22, the device of Noddin in view of Kurashima in view of Jonas shows that the through plating extends through each of a further plurality of layers (such as Elements 8 and 10 in Fig. 1 of Noddin) and is coupled (due to the physical contact therebetween) to each of the first plurality of layers through which the through plating extends).

m. Regarding claim 23, the device of Noddin in view of Kurashima in view of Jonas has the through plating extending through each of a third plurality of layers (such as Elements 8 and 10 in Fig. 1 of Noddin) which are different than the first lower layer and is coupled to the third plurality of layers (due to the physical contact therebetween) through which the through plating extends. The through plating is electrically conductive (see, as shown above, Element 28 in Figs. 1-2 of Kurashima) and at least two of the layers of the first and second plurality of layers which the through plating is coupled are electrically conductive (see Elements 5 and 6 in Fig. 1 of Noddin) and in ohmic contact with the through plating (conductive material in the through plating via, Element 12 in Fig. 1 of Noddin, makes electrical contact to each of second plurality of layers of Elements 5 and 6 in Fig. 1 of Noddin where those layers are exposed to the through plating via as shown in Fig. 1 of Noddin).

Art Unit: 2891

n. Regarding claim 24, the device of Noddin in view of Kurashima in view of Jonas has a solid through plating (see Element 28 of Kurashima which is filled into Element 12 in Fig. 1 of Noddin as described above).

Response to Arguments

24. Applicant's arguments filed 17 February 2009 have been fully considered but they are not persuasive.

For responses to each specific argument set forth, see the responses to arguments above in the Office Action (they have been included above in order to most simply match each argument with each respective rejection or objection).

25. Applicant's arguments, see Remarks, filed 17 February 2009, with respect to claims 17-24 have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of newly discovered prior art (see above).

Conclusion

26. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Shibata (JP `049) and Koizumi (JP `876) each teach through platings with truncated conical cross-sections.

Art Unit: 2891

Contact Information

27. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MATTHEW W. SUCH whose telephone number is (571)272-8895. The examiner can normally be reached on Monday - Friday 9AM-5PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kiesha Rose can be reached on (571) 272-1844. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Matthew W. Such/
Examiner, Art Unit 2891

MWS
6/12/09

/Douglas M Menz/
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6/20/09